

The impact of reduced general bone mineral density on cortical bone of the edentulous mandible

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Purpose/Objectives: The aim of this study was to detect impact of reduced general bone mineral density (BMD) on mandibular cortical bone thickness in edentulous postmenopausal females.

Methods and materials: In the present study 64 edentulous females were included, aged 54-87 years (mean age 70.4 ± 8.4y) who undertook cone beam computed tomography (CBCT) investigation (Next generation i-CAT) for implant planning.

Both femoral neck and lumbar spine BMD measurements were done by dual energy X-ray absorptiometry (DXA). The worst T-score reading from both was included. Patients were divided into 3 groups according to DXA results: normal BMD (T-score ≥ -1.0), osteopenia (T-score < -1.0 to -2.5) and osteoporosis (T-score ≤ -2.5).

CBCT images were analyzed with OnDemand3D software. In cross-sectional CBCT images, three areas of the mandible (lateral incisor, first premolar, first molar) were selected to determine vestibular and lingual cortical bone thickness. In the mental foramen region inferior cortical width of the mandible was measured.

To detect the differences between groups One-way ANOVA was used.

Result: Based on the DXA results, patients were stratified into 3 groups: normal BMD -18 (mean age 70.39±9.3y), osteopenia- 28 (mean age 70.29±8.23y) and 18 (mean age 70.56±8.2y) had osteoporosis (p=0.995).

The vestibular cortical bone width at incisive and premolar regions in osteoporosis and osteopenia groups was found to be less than in normal BMD group: osteoporosis (1.26 ± 0.32 mm), osteopenia (1.36±0.39mm), normal BMD (1.79±0.59 mm); p=0.001; osteoporosis (1.40±0.38 mm), osteopenia (1.42±0.38 mm), normal BMD (1.76±0.48 mm), p=0.013.

Osteoporosis group also showed reduced inferior cortical bone thickness in the region of mental foramina: osteoporosis (2.63±0.73 mm), osteopenia (3.38±1.17 mm), normal BMD (3.09±0.72 mm), p=0.039.

There was no statically significant difference between the groups according to vestibular cortical bone thickness in molar region and lingual cortical bone thickness in all regions of mandible.

Conclusion: Postmenopausal females with reduced BMD showed reduced cortical bone thickness in the edentulous mandible.

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The relationship between bone mineral density and grey value measurements of jaw bones in postmenopausal females

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Purpose/Objectives: The aim was to determine relation between general bone mineral density (BMD) to grey values (GVs) found using cone beam computed tomography (CBCT) in jaw bones of postmenopausal females.

Methods and materials: In the present study 64 edentulous females aged 54-87 years (mean age 70.4±8.4y) who underwent CBCT (Next-generation i-CAT, Kavo, Germany) examinations due to dental implant planning were included.

Bone mineral density measurements of lumbar spine and both femoral necks by dual energy X-ray absorptiometry (DXA) (Lunar DEXA DPX-NT, GE Medical Systems) were made. The worst T-score reading from both were taken into account. Based on DXA results patients were divided into 3 groups: normal BMD (T-score ≥ -1.0), osteopenia (T-score < -1.0 to -2.5) and osteoporosis (T-score ≤ -2.5).

CBCT images were analysed with OnDemand3D (Cybermed Inc., Korea) software. In cross-sectional CBCT images, three different areas of the mandible (lateral incisor, first premolar, first molar) and the region of tuber maxillae were selected to determine the average GV of the jaws. Measurements were made with a 10 x 20mm region of interest (ROI) in the middle of relevant cross-sectional images and were realized by two independent observers, each made measurements twice at a two-week interval.

The difference between groups was evaluated by One-way ANOVA with Bonferroni correction. Pearson correlation was used to determine a correlation between GV and age. Measurement agreement was determined by Cronbach's alpha test.

Result: There were 18 patients with normal BMD (mean age 70.39±9.3y), 28 patients with osteopenia (mean age 70.29±8.2y) and 18 patients with osteoporosis (mean age 70.56±8.2y). The age differences between groups were not statistically significant (p=0.995).

The osteoporosis group showed the lowest GV compared to other groups, however, no statistically significant difference was found. A weak negative correlation was found between age and the first molar region measurements (r=-0.289, p=0.021).

Intraobserver and interobserver agreements were from acceptable to excellent (0.68 ≤ α ≤ 0.91).

Conclusion: There were found no relationship between BMD and GV of jaw bones in postmenopausal females.

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